Considerations for Planning and Management in the Superior Coastal Plain

The following information summarizes ecological considerations for planning and management in the Superior Coastal Plain. This section is meant to be a summary of the type of information the department uses when making master planning decisions. Information is sourced from numerous documents, including primarily:

- The Ecological Landscapes of Wisconsin: an assessment of ecological resources and a guide to planning sustainable management (WDNR 2015)
- Rapid Ecological Assessments (for specific property groups; WDNR)
- Wisconsin Wildlife Action Plan (WDNR 2015)

The master planning process accounts for both ecological and recreation considerations. Though the two may seem distinct, they are intertwined: outdoor recreation opportunities are shaped by the ecological characteristics of a property. Thus, the ecological information presented here also influences recreation planning on DNR properties.

Natural Communities and Priority Habitats on DNR managed properties

Priority habitats and natural communities are the bedrock ecological considerations for master planning. These define the other ecological resources that may be present on a property. In seeking to maximize habitat and wildlife impacts with the resources available, DNR has created a listing of priority habitats. The top-rated priority habitats for northern Wisconsin are listed below:

Terrestrial/Wetland	Aquatic
Deep marsh/shallow lakes (only those with wild rice opportunity)	Coldwater Streams
Great lakes dunes, wetlands, and shores	Large Lake – deep, soft, and very soft, seepage
Oak/pine barrens	Large Lake – deep, soft, drainage
Old Forests (natural origin pine, hemlock, cedar, northern hardwoods)	Large Lake – shallow, soft, drainage
Young forests	Lake Superior
	Spring Pond, lake – spring
	Springs and Spring Runs (hard)
	Springs and Spring Runs (soft)

Natural communities present on a property are driven by the habitat type and represent more specific land cover classification than habitat type. The Wisconsin Wildlife Action Plan (WDNR 2015) and the Ecological Landscapes of Wisconsin (WDNR 2015) identify the following 32 natural communities for which there are “Major” or “Important” opportunities for protection, restoration, or management on DNR-managed properties in the Superior Coastal Plain Ecological Landscape:

- Alder Thicket
- Aspen-Birch Forest
- Bedrock Shore
- Black Spruce Swamp
- Boreal Forest
- Clay Seepage Bluff
- Coldwater streams
- Coolwater streams
- Dry Cliff
- Emergent Marsh
- Floating-leaved Marsh
- Floodplain Forest
- Great Lakes Beach
- Great Lakes Dune
- Interdunal Wetland
- Lake Superior
- Mesic Floodplain Terrace
- Moist Cliff
- Muskeg
- Northern Dry Forest
- Northern Dry-Mesic Forest
- Northern Hardwood Swamp
- Northern Mesic Forest
- Northern Sedge Meadow
- Northern Tamarack Swamp
- Northern Wet Forest
- Poor Fen
- Riverine Mud Flat
- Shore Fen
- Shrub-carr
- Submergent Marsh
- Warmwater river

Game Species

The Superior Coastal Plain provides good opportunities for hunting, trapping, and fishing. Species such as white-tailed deer, American black bear, American beaver, North American river otter, fisher, bobcat, ruffed grouse, American woodcock, Canada goose, mallard, wood duck, and ring-necked duck are all important game species.

Lake Superior supports an important sport fishery for lake trout, coho salmon, lake whitefish, brown trout, lake herring, and rainbow smelt. Walleye, smallmouth bass, northern pike and yellow perch are popular pursuits in the shallower bays such as Chequamegon Bay. Chequamegon Bay has a national reputation as a trophy smallmouth bass fishery, which supports a small charter/guide industry. Tributaries to Lake Superior are spawning areas for introduced nonnative salmonid species such as rainbow trout, brown trout and coho salmon; all popular with anglers, especially during spawning runs. Upper reaches and headwaters of some streams contain native brook trout, also popular with anglers.

Game species management is described on the department web page at DNR.wi.gov with key words: game species.

Bird Species - Resident and Migratory

The Lake Superior shoreline is an important nesting and migratory corridor for millions of birds, including hawks, waterbirds, and passerines. Raptors and passerines use the shoreline as a landmark and as feeding and resting places during migration. Waterfowl are common along the Lake Superior shoreline especially during migration. In winter, species that inhabit the northerly areas of Canada and Alaska sometimes visit, including the great gray owl, northern hawk owl, boreal owl and gyrfalcon. Snowy owls winter regularly.

The merlin, often associated with boreal forest, is most abundant in this part of Wisconsin. The coniferous and mixed forests, abundant prey base, and extensive Lake Superior shoreline make this landscape an important breeding area for them.

Ten Important Bird Areas are designated within or partially within this Ecological Landscape (WDNR 2007) (see previous section entitled, Important Bird Areas, a few pages before this one).

Photo by Ryan Brady

Considering Species of Greatest Conservation Need

The Wisconsin Wildlife Action Plan identifies ecological priorities within each Ecological Landscape. Priorities represent the natural communities in each Ecological Landscape that are most important to Species of Greatest Conservation Need (SGCN). This concept is represented by the highlighted "priorities" section shown in the center of Figure 1. SGCN are native wildlife species with low or declining populations that are most at risk of no longer being a viable part of Wisconsin's fauna. The center "priorities" can also be used to determine which natural communities provide the most habitat for SGCN and rare plants (Figure 2). For detailed information specific to the Superior Coastal Plain Ecological Landscape and these properties, including lists of species and the habitats with which they are associated, please see the Wildlife Action Plan and the appendices in the property-specific Rapid Ecological Assessments (WDNR 2009; WDNR 2011; WDNR 2014)

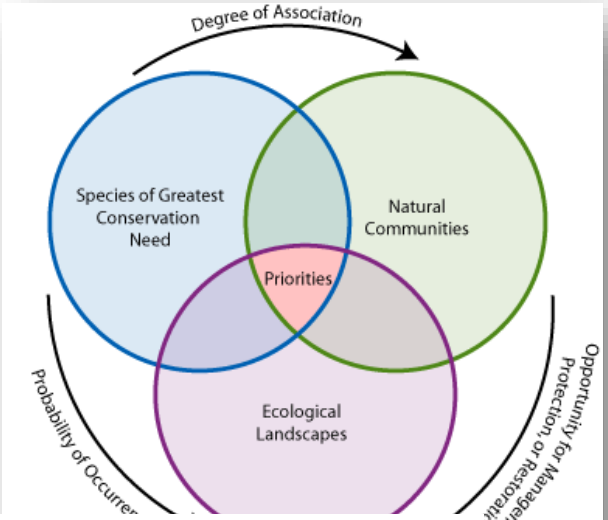
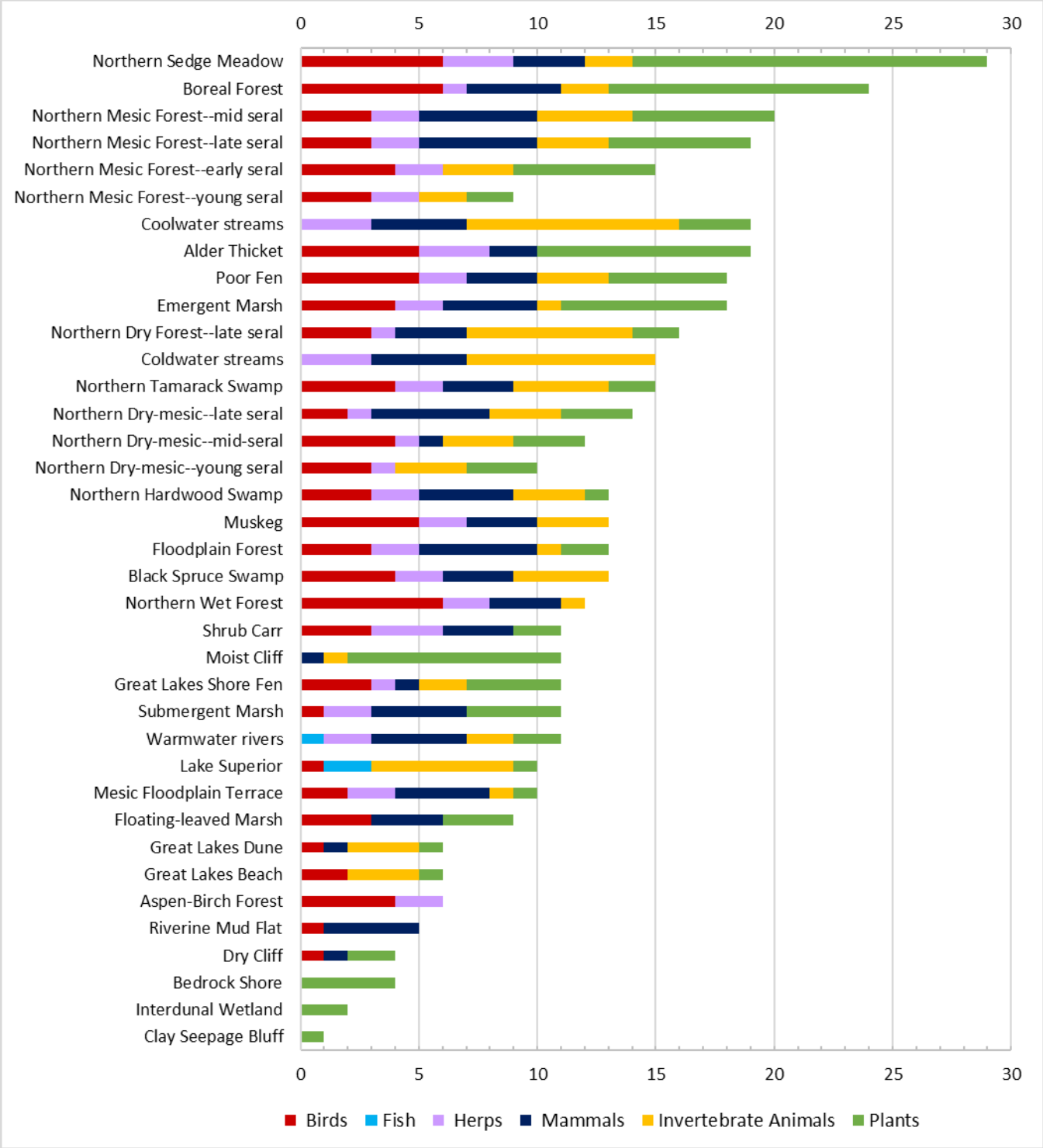


Figure 1: Illustration of the process used to identify Ecological Priorities in the Wisconsin Wildlife Action Plan.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5
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Northern Sedge Meadow
Boreal Forest
Northern Mesic Forest--mid seral
Northern Mesic Forest--late seral
Northern Mesic Forest--early seral
Northern Mesic Forest--young seral
Coolwater streams
Alder Thicket
Poor Fen
Emergent Marsh
Northern Dry Forest--late seral
Coldwater streams
Northern Tamarack Swamp
Northern Dry-mesic--late seral
Northern Dry-mesic--mid-seral
Northern Dry-mesic--young seral
Northern Hardwood Swamp
Muskeg
Floodplain Forest
Black Spruce Swamp
Northern Wet Forest
Shrub Carr
Moist Cliff
Great Lakes Shore Fen
Submergent Marsh
Warmwater rivers
Lake Superior
Mesic Floodplain Terrace
Floating-leaved Marsh
Great Lakes Dune
Great Lakes Beach
Aspen-Birch Forest
Riverine Mud Flat
Dry Cliff
Bedrock Shore
Interdunal Wetland
Clay Seepage Bluff
Birds
Fish
Herps
Mammals
Invertebrate Animals
Plants

Figure 2. Number of SGCN and Rare Plants Highly or Moderately Associated with Natural Communities that have High or Moderate Opportunities for Protection, Restoration or Management in the Superior Coastal Plain Ecological Landscape.[1]

Rare Animals

Wisconsin's Natural Heritage Inventory (NHI) Working List includes those species listed either at the Federal and/or State level. As of November 2009, NHI documented 62 rare animal species within the Superior Coastal Plain Ecological Landscape including 3 mammals, 28 birds, 4 herptiles, 2 fishes, and 25 invertebrates. This includes one U.S. Endangered species, 5 Wisconsin Endangered species, 5 Wisconsin Threatened species, and 51 Wisconsin Special Concern species.

Moose

Moose were historically present in the Superior Coastal Plain ecological landscape. Today, they are occasionally observed as visitors from Minnesota or Michigan. A breeding population is no longer present in Wisconsin; moose are a USFWS candidate for the Endangered Species List. Historically, moose were found throughout the northern third of Wisconsin, most abundant in northwestern Wisconsin, then decimated by hunting and brain worm disease.

Rare Plants

The rare plant database of WDNR's Natural Heritage Inventory (WDNR 2009) contains records for 81 vascular plant species occurring within the Superior Coastal Plain Ecological Landscape that are currently listed as Endangered (10), Threatened (18), or Special Concern (53) by the state of Wisconsin.

Primary Sites: Site-specific Opportunities for Biodiversity Conservation

"Primary Sites" are identified during the Rapid Ecological Assessment (REA) process and included in REA reports prepared by the department (NHC program) for special consideration during the master planning process. REAs help summarize projects that collected biological inventory information about DNR properties. They document and help evaluate potential habitat for rare species and identify natural community management opportunities. Primary Sites encompass the best examples of 1) rare and representative natural communities and 2) documented rare species populations with opportunities for restoration or connections[1]. Primary sites warrant high protection and/or restoration. All Primary Sites can be considered High Conservation Value Forests for purposes of Forest Certification.

Existing NHI data are often the starting point for conducting this biotic inventory to support master planning. Rapid taxa surveys are limited in scope and focus on documenting high quality natural communities, rare plants, breeding birds, herptiles, and, for some properties, aquatic and terrestrial invertebrates. The collective results from these surveys are used to identify ecologically important areas (Primary Sites) on the properties.

For information about primary sites on properties with current ch. NR 44-approved plans, see the 'completed master plans' tab on the DNR master plan web page, to access the specific master plan.

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[1] Teams of species and natural community experts and professionals assigned association scores to each species and natural community combination and opportunity scores to each natural community and ecological landscape combination. Each combination was ranked by team participants as high, moderate, low or none. Definitions for each level may be found at: http://dnr.wi.gov/topic/WildlifeHabitat/documents/AOScoresmetadata.pdf.

[1] The NHC program is collecting/analyzing field data to finalize Primary Site determinations by August 2018.

Primary Sites for properties specifically being updated in this 2018 Superior Coastal Plain plan are listed below. Site boundaries and acreages provided are approximations.

1) Copper Creek Gorge (Pattison SP)
2) Pattison Mesic Forest (Pattison SP)
3) Big Manitou Falls and Gorge SNA (Pattison SP)
4) Amnicon River and Dry-mesic Forest (Amnicon Falls SP)
5) Hemlock Hardwood Forests and Wetlands (Copper Falls SP)
6) Bad River Forests (Copper Falls SP)
7) Copper Fall SNA (Copper Falls SP)
8) Red River Breaks Boreal Forest and Hardwood Swamp (St Louis River SBPA)
9) St. Louis River Dry-mesic Forest
10) Fond du Lac Marshes (St Louis River SBPA)
11) Pokegama Carnegie Wetlands SNA (311 ac Douglas Co)
12) Big Bay Sand Spit and Bog SNA and Big Rock Point (includes the SNA and other areas at Big Bay SP)
13) Fish Creek Estuary (South Shore Lake Superior F&WA)
14) Upper Pikes Creek Boreal Forest (South Shore Lake Superior F&WA)
15) Upper Sioux River Big Rock Pines (South Shore Lake Superior F&WA)
16) Sioux River Bayview Beach (South Shore Lake Superior F&WA)
17) Port Wing Boreal Forest SNA and Bibon Lake (includes the SNA and South Shore Lake Superior F&WA, Bayfield Co)
18) Lost Creek Bog SNA (853 ac, Bayfield Co)
19) Bark Bay Slough SNA (646 ac, Bayfield Co)
20) Nourse Sugarbush SNA (438 ac, Bayfield Co)

ADDITIONAL REGIONAL & PROPERTY ATTRIBUTES

Additional large-scale research and planning efforts that previously identified significant ecological attributes in the Superior Coastal Plain Ecological Landscape are worth consideration. The features they identified, or the subsequent rules or designations that resulted, are listed below.

Land Legacy Report

The Land Legacy Report (WDNR 2006b) was designed to identify Wisconsin's most important conservation and recreation needs for the next 50 years. The following "Legacy Places" received the highest ranking (5 stars), implying that if restoration efforts are needed for the area, conservation actions would have a high likelihood of long-term success.

- Bois Brule River
- Apostle Islands
- Chequamegon Point/Kakagon Slough
- Western Lake Superior Drowned River Mouths (Port Wing, Bark Bay, Lost Creek, Raspberry Bay, Fish Creek)

Additional places identified for "excellent and very good ecological qualities with very good chances of restoration success":

- Bad River
- Lake Superior South Shore Streams
- Montreal River
- Nemadji River and Wetlands
- St. Louis Estuary and Pokegama Wetlands
- White River
- Big Bay (area within state park, Madeline Is)

Conservation Opportunity Areas

The Wisconsin Wildlife Action Plan (WDNR 2015) identifies Conservation Opportunity Areas (COA) in Wisconsin that contain ecological features, natural communities, and/or Species of Greatest Conservation Need (SGCN) habitat for which Wisconsin has a unique responsibility for protecting, when viewed from the global, continental, upper Midwest, or state perspective. (see COA map). The COAs in this landscape include:

- Apostle Islands COA
- Bad River COA
- Bibon Swamp COA
- Brule Boreal Forest COA
- Coastal Headlands and Estuaries COA
- Fish Lake COA
- St. Louis Estuary COA
- Bad River COA
- White River COA
- Gogebic-Penokee Ranges COA

Important Bird Area

Ten Important Bird Areas (IBA; WDNR 2007) in this landscape are critical sites for the conservation and management of Wisconsin's birds. Three of them are within properties of this (2018) Superior Coastal Plain master plan update:

- South Shore Fish & Wildlife Areas – habitat for breeding birds and migratory bird stopover site.
- South Shore Wetlands – (Port Wing, Bark Bay & others) habitat for breeding birds, including wetland birds, and a significant raptor migration route.

Outstanding and Exceptional Resource Waters (ORW and ERW)

These officially designated waters (ch. NR 102.11 Wis. Admin. Code) provide outstanding recreational opportunities, support valuable fish and wildlife habitat, have good water quality, are not significantly impacted by human activities, and are recognized as being the highest quality waters in the state. **ORWs** comprise less than 1% of over 15,000 rivers, lakes, and waterbodies in WI; they typically do not have any point sources discharging pollutants directly to the water (for instance, no industrial sources or municipal sewage treatment plants) and no increases of pollutant levels are allowed. If a waterbody has existing point sources at the time of designation, it is more likely to be designated as an **ERW**. Examples include:

ORW

- Amnicon River (Amnicon Falls State Park)
- Bad River (Copper Falls State Park)
- Tyler Forks (Copper Falls State Park)
- Flag River, Fish Creek, Sioux River, Fourmile Creek, North Pikes Creek, Iron River, Cranberry River

(South Shore Lake Superior Fish & Wildlife Area)
- Bark River (Bark Bay Slough SNA)
- White River (White River Fishery Area)

ERW
- Copper Creek Tributary (Pattison State Park)
- Red River (St. Louis River Streambank Protection Area)
- White River (Bibon Swamp; White River Wildlife Area)

Wetland Gem Designation
The Wisconsin Wetlands Association identifies 12 high-quality sites in the Superior Coastal Plain as "Wetland Gems" in its publication, Wisconsin Wetland Gems. The 'gems' on DNR properties are:

- St. Louis River Estuary Marshes - extensive marshes with other wetland habitats that support many native plants, breeding and migratory birds, and serve as nursery for numerous native fish species.
- Pokegama Carnegie Wetlands - the state's most expansive and intact example of red clay flat wetlands, which occur only in the area of Superior, Wisconsin. This alder thicket, sedge meadow and marsh on slightly undulating clay soils supports great floristic diversity, with numerous and sizable populations of rare plants.
- Bibon Swamp - a diversity of natural communities with numerous rare species.
- Bark Bay & Lost Creek Bog
- Big Bay
- Nemadji Floodplain Forest

Priority Navigable Waterways
Priority Navigable Waterways (**PNW**s) are a broad category of officially designated lakes and streams that includes ORWs and ERWs and Areas of Special Natural Resource Interest (ASNRI), and waterways that sustain breeding populations of trout, walleye, musky, or sturgeon. The SCP has one PCW, listed below.

- **St. Louis River** (including the area adjacent to St. Louis and Red Rivers Streambank Protection Area and the area surrounding Clough Island) is a **PNW Musky Area** and **PNW Sturgeon Area**.

Wisconsin's Impaired Waters (303d)
Section 303(d) of the federal Clean Water Act requires states to develop a list of impaired waters. The identification and listing of waters as impaired is part of waterbody classification, assessment, and management. The goal for all 303(d) waters is to protect, restore, and maintain the full potential of the waterbody to the maximum extent possible. The St. Louis River is an Area of Concern (AOC) that is listed for contaminated sediment (DDT and Dieldrin), contaminated fish tissue (mercury and PCBs), and chronic aquatic toxicity (PAHs and unspecified metals). A Total Maximum Daily Load (TMDL) has been developed for mercury.

Recreation Considerations

Outdoor recreation in the Superior Coastal Plain is diverse. From camping and hiking to ATV riding and hunting, residents and visitors take part in a wide variety of activities in the Superior Coastal Plain. Extensive investigation into the recreation needs and opportunities of the public have been undertaken in the Statewide Comprehensive Outdoor Recreation Plan (SCORP) and Recreation Opportunity Analysis (ROA) processes. The results of these processes are used in the property master planning process. The information from the SCORP and ROA processes that will be used in planning for the Superior Coastal Plain is summarized in the Recreation Resources and Opportunities of the Superior Coastal Plain folder of this master planning web page.

Additional Planning Considerations

"The Ecological Landscapes of Wisconsin: an assessment of ecological resources and a guide to planning sustainable management" (WDNR 2015) gave additional considerations for planning and management in the Superior Coastal Plain. These considerations are reproduced below.

> Major planning and management considerations in the Superior Coastal Plain include climate change; impacts of water level changes on the coastal wetlands and associated biota (including attempts to stabilize the water level of Lake Superior); the continued appearance and spread of invasive species; population trends in certain native species; managing water on the clay soils; and increasing the acreage of conifer-dominated boreal forest. Other important issues are shoreline development along rivers and Lake Superior and protection of areas used by migratory birds and spawning fish. Management of lands in the red clay country to lessen erosion and improve water quality and habitat for aquatic life, and reduce negative edge impacts (construction, agriculture, forestry - including reforestation), are issues deserving major consideration. The occurrences of many rare and geographically limited natural communities of exceptional quality have been documented here recently, along with numerous associated rare species. The coastal estuaries are regionally significant repositories for intact natural communities, such as conifer swamp, sedge meadow, fen, and marsh. Many rare plants and animals have been documented in the estuaries, which are also important nursery areas for fish. Use of some of these coastal wetlands, lagoons and associated sandspit habitats by migratory birds is very high, and some of the rare species use these habitats to the exclusion of most or any others.
>
> Lake Superior, largest freshwater lake in the world, affects virtually all natural features and many economic aspects of this landscape. Continued cooperation and coordination across county, state, and international boundaries will be needed to sustainably manage this globally important resource over time. The freshwater estuaries here are exceptional and offer opportunities to protect or restore many high-quality wetland habitats. The National Oceanic and Atmospheric Administration (NOAA) designated the St. Louis River Estuary as part of a nation-wide system of National Estuarine Research Reserves. This designation has opportunities for coastal wetland-related research, stewardship, and education through private, state, and federal partnerships. The Bad River-Kakagon Sloughs is designated a "wetland of international significance" (2012) through the Ramsar Convention on wetlands of international importance.
>
> The Superior Coastal Plain offers excellent opportunities to maintain high-quality examples of many natural community types. The "sandscapes," with their beach, dune, barrens, and dry forest communities, are among the best examples known from the western Great Lakes region. Bedrock features include cliffs, glades, and ledges, and these provide habitat for rare plants, some of them at their extreme range limits. The extensive red clay wetlands in and around the city of Superior host exceptional concentrations of rare plants. Boreal Forest once covered much of the Superior Coastal Plain, and the ecological landscape presents the state's best opportunities to protect, restore, and maintain this natural community. Restoring conifers to these forests, now largely dominated by aspen, is a major opportunity. Collectively, these forests provide opportunities to increase large trees, cavity trees, coarse woody debris, patches of old-growth forest, large forest patches, and a reduction of the hard edge that is now prevalent throughout much of this region. Old growth hemlock-hardwood forests, now extremely rare anywhere in Wisconsin, occur on several of the Apostle Islands. Browse-sensitive conifers, such as eastern hemlock, northern white-cedar, and Canada yew, are common and reproducing well in these island forests.

Primary Sites within the Superior Coastal Plain

The following describe the previously noted primary sites. All State Natural Areas are also primary sites and already have information documented on their respective websites.

1) Primary Site – Copper Creek Gorge, 67 acres

Site Description: This site surrounds Copper Creek, a medium hard water stream with scenic waterfalls and deep gorge where the creek goes over the Superior escarpment. Within the gorge are Dry Cliffs on exposed sandstone bedrock with other areas eroded down to the underlying basalt. South and west-facing cliffs are very dry, whereas north and east-facing cliffs are somewhat moister. Characteristic Dry Cliff vegetation is present and includes numerous fern species with columbine, harebell, and northern bush-honeysuckle. The surrounding area has northern white-cedar, balsam fir, and white spruce along the stream with red pine and Northern Dry-mesic Forest on top of and extending away from the bluffs. Away from the bluffs, the forest becomes dominated by trembling aspen and balsam fir that replaced cutover-era Boreal Forest.

Significance: An excellent population of rare Laurentian bladder fern is present within the gorge on the south-facing cliffs. Only twelve populations from five counties are known. There is Boreal Forest restoration potential for the surrounding uplands and this site offers a major opportunity to protect this rare forest type. The Wisconsin Wildlife Action Plan notes protecting Boreal Forests, within an existing forested context, as a conservation action. Pattison State Park offers high conservation value throughout the property, due to the good forest context here (WDNR 2006). These forest connections and increased patch-sizes benefit many plants and animals requiring large tracts of forest. The best richness and diversity of birds on the Pattison State Park, particularly of wood warblers (magnolia, blackburnian, mourning, Nashville, and black-throated green), was noted during breeding bird surveys within this primary site. Copper Creek is a designated Exceptional Resource Waterway.

Management Considerations: The site presents a good opportunity to restore Boreal Forest, largely restricted in the state to the Superior Coastal Plain Ecological Landscape, and greatly diminished from historical acreage due to past logging operations and conversion to agricultural lands. Restoration of Boreal Forests on the uplands of the site could focus on reducing the dominance of aspen in the forest and planting additional characteristic conifer species like white pine, white spruce, and northern white-cedar. Nearby Boreal Forest restoration projects (Brule River State Forest and Pokegama – Carnegie State Natural Area) could provide baseline techniques to make this effort successful. Copper Creek is a designated Exceptional Resource Water, such that protecting the stream from runoff and degradation and promoting a healthy forest are important steps in conserving this important resource. Protecting the gorge and sensitive cliff flora, including rare species, by limiting access and resulting trampling of the area, would be beneficial to the floristic value of the site.

2) Primary Site – Pattison Mesic Forest, 126 acres

Site Description: A rich Northern Mesic Forest with a mature, uneven-aged, closed canopy (70-90%) of large diameter canopy trees with good size distribution is located along the Black River and extends north and east across the property. The canopy is a mix of characteristic hardwood and conifer tree species with coarse woody debris, well developed and moderate to good pit-and-mound topography present. There are pockets of wet coniferous forest embedded within the site near the Black River and a larger white cedar swamp at the north end that transitions to a Hardwood Swamp dominated by black ash to the east. Ephemeral Ponds are scattered throughout the mesic forest. The rich ground flora is variable and patchily distributed with some very rich pockets of spring ephemerals.

***Significance**:* Good-quality examples of older aged, rich Northern Mesic Forests are extremely rare in Douglas County and the clay plain landscape, thus protecting them is important and special designation could be warranted during the master plan process. Ephemeral Ponds are interspersed throughout the forest and are important breeding areas for many amphibians. Blue-spotted salamanders were found in the Ephemeral Ponds and are indicator species of good-quality mature forests. Several SGCN birds are breeding within the site and require large blocks of unfragmented and older-aged forest stands. Of particular note, a Northern Goshawk nest was found at the site.

***Management Considerations**:* Early identification of Ephemeral Ponds and their associated species distributions throughout the forest would enable adaptive management to protect amphibians, without hindering other management or recreational activities. Additional opportunities exist to allow the mesic forest to mature and further develop old-growth characteristics and to connect these sites to the vast forests of the Northwest Lowlands Ecological Landscape to the south. There is additional Northern Mesic Forest west of the river that could be allowed to develop into older-aged forest with additional structural attributes. These conservation actions would help maintain the overall species diversity of the AFPSP by increasing habitat for area-sensitive forest birds, wide-ranging mammals like the American marten, and numerous rare plant species found in mature forests.

3) Primary Site – Big Manitou Falls and Gorge SNA, 60 acres (Map)

Site Description: Big Manitou Falls and Gorge contains a unique river gorge carved out of both sandstone and basalt and includes the 165' high roaring, cascading falls of the Black River. The site is predominantly made up of good-quality Boreal Forest with Northern Mesic Forest elements and cliff communities within the gorge. The canopy is dominated by white spruce, red pine, white pine, northern white-cedar, paper birch, and red oak. The shrub and sapling layer includes Canadian yew, round-leaved dogwood, balsam fir, mountain maple and red maple. The groundlayer is dominated by ferns (common polyploidy, narrow beech fern, common lady fern along the cliffs and forest herbs including large-leaved aster, American spikenard, columbine, and thimbleberry). Big Manitou Falls and Gorge is DNR-owned and was designated a State Natural Area in 2003.

Significance: The site protects Big Manitou Falls, highest waterfall in Wisconsin. Several rare species have been found within the rocky gorge – Oregon woodsia, Laurentian bladder fern, Canadian yew, and the mystery vertigo land snail. The Oregon woodsia fern at the site is exceedingly rare in Wisconsin and is one of only three populations in the state. The state Threatened Ram's-head Lady's-slipper is found in the forested areas of the site. Good examples of Boreal Forest, like those found at the site, are increasingly rare within the state. Identifying and protecting this forest type within an existing forested context is a priority (WDNR 2006).

Management Considerations: Management as a moist cliff reserve, a rare plant protection site, a significant geological site, and an ecological reference area would be appropriate. Natural processes should determine the structure of the moist cliff. This will protect the land snails and numerous rare fern species associated with these areas. Passive management of the site, allowing nature to determine the ecological characteristics of the state natural area, would benefit the intact Boreal Forest community present. Exceptions include control of invasive plants and animals, and maintenance of existing facilities. Control measures for white-tailed deer should be explored to protect the Canadian yew, a favorite browsing shrub of deer. Providing opportunities for research and education on moist cliffs, rare plants, and especially geological features at the site should be considered.

4) Primary Site – Amnicon River and Dry-mesic Forest , 58 acres

***Site Description**:* This site includes moderate-to-good-quality, older-aged Northern Dry-mesic Forest along the Amnicon River with several dramatic waterfalls and cool, seepy cliff and wetland complex along a small tributary stream. The canopy of the Northern Dry-mesic Forest is dominated by large diameter white and red pine. The subcanopy and shrub layers are sparse with small amounts of beaked hazelnut and northern bush-honeysuckle. The

groundlayer is somewhat depauperate and includes pearly everlasting, wood anemone, bracken fern, and numerous rare species. There are small inclusions of Northern Sedge Meadow dominated by Canada blue-joint grass and reed canary grass within the small ravines where a tributary stream flows to the Amnicon River. The activity center of the park is adjacent to the site with numerous trails, paved roads and parking lots, and the campground is found in close proximity. Beyond these developed areas, most the surrounding uplands are formerly cut-over Boreal Forest, now dominated by trembling aspen with balsam fir.

***Significance**:* Several rare plant species are located along the Amnicon River within this pine-dominated forest. Many are associated with cool moist cliffs and ledges along the Amnicon River, including several fern species: Laurentian bladder fern, fragrant fern, and purple clematis. The uncommon Canada warbler is present in the upland forests and wood turtles are known from this stretch of the Amnicon River. Concentrated amphibian breeding areas are located here in wetlands carved out by an unnamed tributary to the Amnicon River. Because wetlands are rare in the park, protecting them is important to its amphibian conservation. The Amnicon River is designated an Outstanding Resource Water and protecting and enhancing this resource would be beneficial to the many species that depend upon it.

***Management Considerations**:* The Northern Sedge Meadow is dominated in part by reed canary grass, with a small patch of purple loosestrife, which pose significant threats to wetlands. Control and monitoring of these non-native species should be a priority.

Important to keep track of wood turtle sightings, especially nesting observations which should be reported to the Natural Heritage Conservation program. Protecting wood turtle nesting areas would be aided by limiting disturbance, including trying to minimize recreational activities near these locations. It is vital to limit road-building near rivers and streams and to maintain riparian forest habitat by assessing impacts of all forest timber sales on wood turtle populations.

5) Primary Site – Hemlock Hardwood Forests and Wetlands, 332 acres

***Site Description**:* Located within Copper Falls State Park, this site contains Northern Mesic Forests on undulating terrain dominated by hemlock, sugar maple, and yellow birch. Ephemeral ponds are surrounded by mixed coniferous/deciduous forest. Other wetlands are dominated by sedge meadow, or sphagnum moss.

***Significance**:* This site has potential to mature into a forest with old-growth characteristics and provide habitat for a specialized group of species.

***Management Considerations**:* This site warrants consideration of a special management designation due to the opportunities it provides to increase habitat available for rare species. Presence of hemlock and yellow birch in an older age class, plus other characteristics of older forests indicates a good restoration possibility. One species already present that needs large, mature mixed forests for nesting habitat is the Northern Goshawk. Protecting this site would provide suitable habitat for several other forest raptor species including the Merlin, Broad-winged Hawk, Barred Owl, & Sharp-shinned Hawk likely nesting at this site or nearby. SGCN birds within the site include Least Flycatcher, Veery, and Wood Thrush. Rare species include Northern Goshawk (SC), gray wolf (den site) (SC), and Cape May Warbler (SC).

6) Primary Site – Bad River Forests, 662 acres

Site Description: Located within Copper Falls SP, this site has a diversity of habitats including Northern Mesic Forest, Hardwood Swamp, Poor Fen, a small seepage lake, mixed coniferous/deciduous slopes and ravines to the Bad River,

as well as steep, clay slopes along the Bad River. Canopy cover of the upland Northern Mesic Forest varies from 20% to 100%. Areas with low canopy cover tend to be dominated by sugar maple and areas that have a higher canopy cover have a mixed canopy of sugar maple, hemlock, and yellow birch, with trembling aspen and basswood as canopy associates. The ground flora varies from areas characterized by large-leaved aster and lady fern to areas with rich mesic forest herbs such as wild leek, Dutchman's-breeches, white and yellow trout-lilies, and broad-leaved toothwort. Occasional areas in the upland have boreal characteristics with trembling aspen and white spruce dominant in the canopy over abundant balsam fir in the understory. Hemlock-dominated stands are rare. Steep slopes and ravines to the Bad River have a mixed coniferous/deciduous forest of mature sugar maple, yellow birch, and hemlock, with occasional white pine in the supercanopy. The ground flora is generally sparse with shining club-moss, hairy Solomon's-seal, and intermediate wood fern. Canada yew is very sparse in deep ravines within the steep slopes. Steep slopes to the Bad River also have exposed, eroding clay slopes with minimal vegetation. Hardwood Swamps in low areas are dominated by black ash with red maple and white cedar as canopy associates. Sphagnum moss is abundant with cinnamon fern, bunchberry, three-leaved gold-thread, and American starflower. Small, ephemeral ponds exist within the hardwood swamps and occasionally the upland forest. Poor Fens dominated by leather-leaf and few-seeded sedge are present in low areas. Tamarack, living and dead, is present occasionally in the fens.

***Significance**:* A diversity of habitats, the Bad River, the current structure of forests, and location within a forested landscape, make this site very important for breeding bird diversity. Currently, one Special Concern bird (Least Flycatcher) and two additional SGCN birds (Canada Warbler Wood Thrush) are known from the site. Other rare species include wood turtle (THR), and West Virginia white (SC). This site also includes Ephemeral Ponds, which are the primary breeding habitat for wood frog, spotted salamander, and blue-spotted salamander. A rare plant was also found over 80 years ago along the Bad River near Copper Falls, and presumably could reappear on sand and gravel bars or clay bluffs.

***Management Considerations**:* Maintaining intact, contiguous, mature closed canopy forest is important for SGCN forest interior bird habitat. Maintaining vertical structural diversity within intact forest stands is important for conservative species like the Canada Warbler and Wood Thrush, which require a dense shrub layer for nesting. Limiting fragmentation associated with, but not limited to, forest management, road building, or utility and pipeline development is important to the continued viability of these large blocks of forest and their associated bird species. Maintaining Ephemeral Pond basin characteristics and hydrology by avoiding rutting is crucial. Forest management that allows for the development of large living trees, snags, and abundant coarse woody debris is also beneficial to both resident birds as well as salamanders that breed in ponds. Minimizing the adverse impacts of deer browsing is also important, particularly for ground-nesting birds and those requiring a dense shrub layer. This site also encompasses a private in-holding in the park.

7) Primary Site – Copper Falls SNA, 665 acres (Map)

All State Natural Areas are primary sites. Please click the link to view the attributes of this State Natural Area.

8) Primary Site - Red River Breaks Boreal Forest and Forested Swamp, 1549 acres

***Site Description**:* This site borders the Red River and associated Wisconsin tributaries that run into the lower St. Louis River above the city of Oliver. It consists of deeply-incised and heavily eroded ravines of red clay soils and an extensive block of undeveloped and roadless forest.

The dominant cover type is Boreal Forest; a mix of trembling aspen, white birch, white pine, and white spruce. The latter three, along with northern white-cedar, are characteristic of the northern Wisconsin "white forest", a unique type of Boreal Forest found near Lake Superior. Conifers (formerly dominant) are presently occurring as scattered

individuals or in small stands, with white spruce, white pine, and balsam fir the most important species. The lower slopes of the steep-sided ravines are often filled with springs, sometimes supporting remnant stands of northern white cedar and unusual herbs. Small but mature stands of large white spruce, black ash, and balsam poplar occur on small terraces above the streams in the ravine bottoms.

Small areas of Clay Seepage Bluffs occur in the upper portions of some of the ravines where groundwater seepage and steep slopes combine to form relative open, moist clay slopes

In poorly drained "flats" on the level ridges between ravines there are patches of black ash-dominated hardwood swamp and thickets of speckled alder and other tall wetland shrubs. A large black ash dominated swamp also occurs along the St. Louis River. Areas of standing water are infrequent, but where present support small emergent marshes and broad-leaved sedge meadows. A few patches of well-drained mesic hardwood forest occur on the ridges, with sugar maple (*Acer saccharum*) and yellow birch, but these are not extensive and, in general, the "northern hardwoods" community is rare on the site.

***Significance**:* The importance of the site to water quality protection of cannot be overstated and was prominent in this acquisition by DNR. The site protects a large stand of the extremely rare Boreal Forest along with Hardwood Swamp on poorly drained “flats” of the St. Louis River. Several bird Species of Greatest Conservation Need and rare plants are found at the site.

***Management Considerations**:* The site's forests, soils, and waters were seriously damaged during past catastrophic logging episodes (Epstein et al. 1997). Many of the fragile springs and seeps in the steep valleys are eroding, leading to excessive sedimentation in the lower drainages. Conifers are generally not reproducing well, due to loss of seed source, unstable and possibly waterlogged substrates, over browsing by white-tailed deer, and possible past damage to soil structure. Thickets of tall shrubs and dense stands of blue-joint grass may be inhibiting the establishment of seedlings of some species.

Clay Seepage Bluffs are present along the southwest "arm" of this site. Open, eroding clay banks are a natural part of this geologically young landscape, and slope failure and bank slumping has been correlated with major rainstorms. A June 2012 "500-year flood" caused nearly twice as many landslide events in the Red River watershed as the previous 61 years combined, with nearly 1,000 mapped sloped failures depositing as much as 16 feet of sediment in the river valleys. Additional research is needed regarding the impact of tree species composition and forest maturity on slope failure.

Enhancement of the site's high-quality Boreal Forests and protection of the roadless condition would help protect the rare plants and animals. Water quality would benefit from forest management that focuses on stabilization of eroding areas and conversion from aspen to conifer-dominated forest. Eradication of non-native invasive species (garden-heliotrope and common tansy) while they are still in manageable numbers would be beneficial to the long-term viability of the site.

9) Primary Site - St. Louis River Dry-mesic Forest, 28 acres

***Site Description**:* This peninsula on the south side of the St. Louis River consists of a sandstone and clay ridge. The west side has steep, tall slopes (~150 ft high) rising abruptly from the river. Slopes are partially forested with white pine, red pine, northern white-cedar, white spruce, and paper birch with bare, eroded areas and exposed clay and sandstone. Groundlayer is sparsely vegetated. The narrow ridge top and eastern slopes are forested with red oak, white and red pine, white spruce, and paper birch, with small areas of sugar maple. Alluvial deposits on the east side support a forest dominated by green ash and balsam poplar, with black ash and white spruce. The northern end of the peninsula shoreline is rocky with areas of exposed sandstone.

Northern Dry-mesic Forest is the primary forest type on the peninsula with lesser areas of Floodplain Forest and Boreal Forest (on steep slopes). The Northern Dry-mesic Forest canopy is dominated by white spruce, red and white pine and red oak with northern white-cedar, white birch, green and black ash, balsam poplar, and sugar maple as canopy associates. The shrub layer includes speckled alder, alternate-leaved dogwood, beaked hazelnut, black currant, thimbleberry, and red raspberry. The ground layer is dominated by false melic grass, ostrich fern, sensitive fern, wood anemone, Canada mayflower, and starflower.

***Significance**:* Unusual features include steep rocky slopes, exposed clay bluffs, sandstone cliffs, river terraces and a former river channel. It is adjacent to Jay Cooke State Park in Minnesota and is a small part of a relatively large block of mature forest in the region. Uncommon plants (American stickseed and purple clematis) occur here with the potential for other rare species to be found.

***Management Considerations**:* There is an old, small quarry on the northeast portion of the site that is succeeding to forest. This area and the entire peninsula should be monitored for non-native invasive plants, which are presently minimal. Common buckthorn and reed canary grass were noted during natural community surveys and should be controlled before they become widespread.

This region experienced major flooding in 2012 and some areas are eroding or have the potential for erosion because of the steep terrain. Reforestation or re-vegetation may be considered to protect these areas from further erosion, including around the old quarry area. The Fond du Lac dam lies just upriver from the site and development pressures, particularly on the Minnesota side, could diminish value of this area as a movement corridor for plants and animals. The site was not surveyed for birds or other fauna. Additional surveys are recommended.

10) Primary Site - Fond du Lac Marshes, 362 acres

***Site Description**:* Extensive emergent and submergent marshes that exist in the upper portions of the St. Louis River Estuary from Fond du Lac, MN downstream to Oliver, WI. They are located inside the main channel's meanders, and in protected, shallow bays along the upland shores of the St. Louis and Red Rivers Streambank Protection Area. Arrowheads, bulrushes, bur-reed, lake sedge, and cattail are among the important emergent aquatics here. Wild rice and sweet flag are locally common. Deeper waters of the marsh complexes support submergent and floating-leaved macrophytes such as coontail, waterweed, yellow water lily, wild celery, and pondweeds. The patches of marsh associated with the main channel are often bordered by a natural levee adjoining the flowing river. Where well-developed, the levees are vegetated with tall wetland shrubs and lowland hardwoods, especially speckled alder, red-osier dogwood, meadowsweet, willows, ashes, and box elder.

***Significance**:* The Fond du Lac Marshes protect water quality and flow, central to maintaining one of the largest freshwater estuaries on the western Great Lakes. These extensive wetlands are important nesting and foraging habitat for migrant and breeding birds, and provide critical spawning habitat for fish and breeding areas for amphibians. A significant population of a rare plant is also found in the marshes

***Management Considerations**:* Upstream dams limit movement of aquatic species and may diminish biodiversity in the lower portion of the St. Louis River. Development pressures, dredging of the river, excessive boat traffic, and urban industrial runoff threaten the viability of this area.

Purple loosestrife is present on the levees and shoreline wetlands, but it is still uncommon, while narrow-leaved cattail is a dominant species here. Both need controlling as resources allow. A wetland functional analysis of wetlands in the St. Louis River estuary is currently being conducted by the Lake Superior NERR and when complete, should aid conservation, management, and restoration.

11) Primary Site – Pokegama-Carnegie Wetlands State Natural Area, 311 acres (Map)

Site Description: Extensive mosaic of wetland vegetation on level, poorly-drained red clay flats between the Pokegama and Little Pokegama Rivers. Shrub swamp, Northern Sedge Meadow, Emergent Marsh, and small ponds characterize the site. An additional 1200 acres of this SNA lies several miles to the south, in the Douglas County-owned parcel.

Significance: Rare plant species are abundant in these wetlands. Some of these species are not widespread in the Lake Superior region but are concentrated here near the City of Superior. In addition, Pokegama-Carnegie is the largest site, has the greatest floristic diversity, supports some of the largest populations of rare species, and may be less likely in the short-term to suffer destruction or fragmentation owing to expanded development, disrupted hydrology, or incursions of aggressive species. The quality and diversity of open and shrub wetland types also support a diverse assemblage of birds including golden-winged warbler and American woodcock.

Management Considerations: The parcel is managed as a reserve for Tamarack (poor) Swamp, Alder Thicket, and Northern Sedge Meadow, as a Boreal Forest and wetland restoration site, as an aquatic reserve, and as a rare plant habitat site. The former forested wetland areas that were historically logged are being converted back to Boreal Forest through brushing and native tree planting. The sedge meadow is actively managed tree/shrub control using tree harvest, brushing and fire to mimic natural disturbance patterns. Rare plants are most often found in managed corridors; mowing of the corridor should enhance the rare plant populations.

Appropriate management and protection of this site is critical. Study of the site's hydrology is needed, as several right-of-ways cross the wetland and may be having impacts which are not known. Some right-of-ways are managed via brush-cutting, which appears to be an effective and appropriate means of maintaining favorable conditions for the rare plants. Examination of the original land survey notes, and the historical and current aerial photographs, would clarify the changes in land use and vegetation composition and structure, which could have management implications. Invasive exotic species may not be a problem, but should be looked for periodically. At least one of several corridors crossing this wetland carries petroleum. A spill could have a devastating impact on the biota.

12) Primary Site - – Big Bay Sand Spit and Bog State Natural Area and Big Rock Point

Site Description: Big Bay Sand Spit and Bog is located within Big Bay State Park on Madeline Island in Lake Superior and features a long, curving baymouth bar behind which lies a lagoon, an extensive peatland complex and older sand ridges. Vegetation consists of submerged aquatics in the shallow water lagoon and bog shrubs on the many small islands as it grades from open water into Great Lakes Shore Fen on the quaking sedge mat, followed by Poor Fen on the older, grounded Sphagnum-sedge mat. Further inland, peatlands transition to a conifer swamp of white cedar, black and white spruces, and tamarack, bordered by a second sand ridge of second growth Boreal Forest, beyond which lies a more acid Black Spruce Swamp. Along Lake Superior, a narrow sandscape consists of the beach, dunes and a narrow zone of Great Lakes Barrens (a shoreline pine savanna). South of the bay, the shoreline is rocky and wraps around Big Rock Point, to the west of which lies a large, mature second growth hardwood forest.

Significance: This site is one of only three large, undeveloped sandspit lagoon and peatland complexes on the Apostle Islands, and the only site in state ownership. The floating mat contains one of the richest Shore Fen floras in the Lake Superior region, and harbors populations of several rare wetlands plants, including one of the largest populations in the state of a state-threatened sedge. Two rare birds (both special concern) and one rare herptile are also known from the site. The site also features approximately 2 miles of upland, undeveloped Lake Superior shoreline, an uncommon feature within Madeline Island.

***Management Considerations**:* The central portion of the site is already designated as a SNA and is managed as an ecological reference area for wetland forest, shore fen, sand spit/dunes/beach and Great Lakes Barrens. Maintaining the hydrology of the peatland complex is of utmost importance, including the intermittent connection to Lake Superior at the north end of the complex (owned by the Town of La Pointe). Monitoring for and managing invasive species in the lagoon, dune, beach, and surrounding habitats is also crucial, especially for species with the ability to rapidly displace rare native species (e.g., Phragmites, non-native cat-tail, etc.). Quiet-water recreation by kayakers and canoeists entering the lagoon should be managed to ensure the sensitive peat soils of the floating mat are not damaged; motorized public access is incompatible with the sensitive lagoon vegetation and SNA designation.

13) Primary Site – Fish Creek Estuary, (South Shore Lake Superior Fish & Wildlife Area)

***Site Description**:* The drowned mouth of Fish Creek and its associated wetlands occupy the head of Chequamegon Bay. This wetland is particularly dynamic, owing to the funnel shape of Chequamegon Bay and the seiche activity that causes frequent and sometimes substantial short-term water level changes. The primary wetland communities are emergent marsh, shrub swamp, and hardwood swamp. The open waters of the "sloughs" also constitute an important feature. The emergent marsh occupies several hundred acres close to the creek mouth. Dominants include bur-reeds, bulrushes, lake sedge, arrowhead and water sedge. Beds of submergent and floating-leaved aquatic macrophytes occur in the open waters of the sloughs and intermingle with the emergents where conditions are suitable. The marsh grades into a shrub swamp of speckled alder and willows, eventually giving way to an extensive forest of swamp hardwoods dominated by black and green ash. Near the mouth of Fish Creek, flats of sand and mud exposed when the water level is low are used heavily by waterfowl, gulls, terns, and shorebirds as loafing or feeding sites.

***Significance**:* With over 300 acres of wetlands, Fish Creek is the largest freshwater estuary complex in Chequamegon Bay. In addition to providing valuable ecosystem services for water quality, it also serves as an important spawning and nursery habitat for fish, stopover habitat for migrating birds, and breeding habitat for several rare marsh birds as well as a rare herptile.

***Management Considerations**:* Located on the outskirts of the City of Ashland and crossed by U.S. Highway 2, this site has been subjected to many disturbances in the past and remains vulnerable to further deterioration unless efforts to address problems are maintained. Efforts to maintain the functional values of this site should continue, as Fish Creek Sloughs are important wildlife and fish habitat. Maintaining the hydrology of all portions of the wetland complex is crucial, including allowing for seiches as well as longer-term fluctuations in Lake Superior water levels. An old access road runs adjacent to the site north of US-2 and east of Highway 13. Plans are underway to install culverts through the roadbed to restore wetland hydrology to this area just outside the primary site. Invasive species monitoring and control is also a critical management need. The loss of ash from Emerald Ash Borer (EAB) is likely, and a proactive management plan should be developed and implemented to retain forested cover and minimize the risk of conversion of ash forests to alder or reed canary grass. Garden valerian is present in the ash swamp, though the colonies are few and the population is currently low. A large powerline corridor runs just south of the site, and should be monitored for invasive species like reed canary grass and Phragmites, and populations controlled when found.

14) Primary Site – Upper Pikes Creek Boreal Forest, (South Shore Lake Superior Fish & WA)

***Site Description**:* This relatively narrow stretch of forest along branches of Pikes Creek supports boreal and mesic forest as well as forested seeps and clay seepage bluffs. The terrain is rugged with extremely steep slopes and ravines cutting at angles in many places. Boreal forests are closed canopy and dominated by white pine up to three feet in diameter, along with large white cedar and red pine, while hemlock dominates north-facing slopes. Some large aspen, white spruce, and black ash are also present. Numerous wildflowers indicative of boreal forests can be found

in the groundlayer. The soil is clay, giving way to sandy silt or sandy clay on the creek terraces. Clay seepage bluffs are scattered throughout and are usually small and sparsely vegetated, but include plants such as balsam poplar, lion's-foot, and golden sedge.

***Significance**:* Though narrow, portions of this site has characteristics of an ecological reference area and contains some of the higher quality older-aged boreal and mesic forests on the Superior Coastal Plain, with pockets likely never logged due to the extremely steep topography and difficult access. The terrain also contributes to the ecological complexity of the site, with all types of aspects and elevations along the slope represented. This leads to an incredible diversity of conifers in a very small area, including mature white pine, red pine, white cedar, white spruce, hemlock, and balsam fir all co-occurring, sometimes within a few acres. The high conifer cover also contributes to maintaining high water quality in Pike Creek by intercepting rainfall, "slowing the flow" of runoff, and allowing for asynchronous snowmelt and greater groundwater infiltration in the immediate Pike Creek drainage.

***Management Considerations**:* Maintaining a mature canopy of diverse conifers and hardwoods with a complex, multi-layered canopy will help continue to provide ecological and water quality benefits. Steep slopes combined with highly erodible clay soils make mechanized equipment unsuitable in many areas, meaning passive management may be the best management option across much of the site. Where canopy is lost due to blowdown or other disturbances, underplanting desirable conifers will help maintain forest composition. Monitoring for and controlling invasive species should also be regularly conducted.

15) Primary Site – Upper Sioux River Big Rock Pines, (South Shore Lake Superior Fish & WA)

***Site Description**:* A high-quality Northern Dry-mesic Forest surrounds a relatively narrow stretch of the upper Sioux River near Big Rock campground, a county park adjacent to state land. The site is notable for its topographic and ecological complexity, with numerous natural community inclusions embedded within the larger dry-mesic forest matrix. Large red and white pine dominate the stands, though boreal species like mountain maple and white cedar are found in the rocky ravines, and shallow depressions perched on the flatter tops are dominated by black ash. Clay seepage bluffs are found amongst the forest stands and a few forested seeps are found toward the slope bottoms. The site is situated on a lacustrine moraine below the sandy Moquah barrens region to the west and therefore has mainly clay soils, though hilltop knobs are sandy.

***Significance**:* This site has characteristics of an ecological reference area. It encompasses a relatively large block of mature, natural-origin red and white pine forest, which is rare throughout northern Wisconsin, particularly on the Superior Coastal Plain. The stand is nearly 120 years old, with some trees likely older. This mature dry-mesic conifer forest in conjunction with the ravines, forested seeps, clay seepage bluffs, and river corridor create a unique juxtaposition of high-quality communities. Mature conifer cover also contributes to maintaining high water quality in the Sioux River by intercepting rainfall, "slowing the flow" of runoff, and allowing for asynchronous snowmelt and greater groundwater infiltration in the immediate Sioux River drainage. A rare mayfly and a rare stonefly (both Special Concern) have been documented from this site, and the river corridor also likely provides a foraging corridor for bats, though no surveys were conducted.

***Management Considerations**:* Management that focuses on maintaining stands of older age-class pine will continue to provide ecological and water quality benefits. Invasive species monitoring and control is needed. Common buckthorn and honeysuckle occur in at least one small area, and bird's-foot trefoil is common on clay seepage bluffs.

16) Primary Site – Sioux River Bayview Beach, (South Shore Lake Superior Fish & WA)

Site Description: This wetland complex at the Sioux River mouth includes Emergent Marsh and Alder Thicket adjoining a narrow, mile-long open peaty swale between two parallel sandspits. The swale includes both a coastal Poor Fen as well as Great Lakes Shore Fen. The beach ridges are forested with white and red pines, balsam fir, and paper birch. The open peatlands of the swale are composed of Sphagnum mosses, ericaceous shrubs, and sedges, with scattered small tamarack. Wetter areas support a mat of woolly sedge, with buckbean, sweet gale and water horsetail. The dominant species of the marsh at the Sioux River mouth are typical of Lake Superior stands and include bur -reeds, soft-stemmed bulrush, cattails, lake sedge, and water arum. Further inland, west of Highway 13, the marsh is heavily dominated by cat-tail.

Significance: Five rare plants occur at the site, including a State Endangered orchid that may be the only known remaining population in the state. One rare bird was also documented here. Use of the site by migratory birds can be significant, especially in the spring. Though relatively small and constrained by the state highway and a railroad grade, this site contains significant wetland communities.

Management Considerations: Threats to the site include the spread of Phragmites and purple loosestrife, disruption of hydrology and water chemistry, recreational overuse, and maintenance activities on Highway 13. Recommendations include the development of a management and protection plan with the Township, DNR, and the Wisconsin Department of Transportation. The plan should provide for periodic monitoring of water quality and both rare and invasive plant species. Currently, Northland College is monitoring Phragmites and narrow-leaved cattail.

17) Primary Site — Port Wing Boreal Forest State Natural Area and Bibon Lake (South Shore Lake Superior Fish & Wildlife Area)

Site Description: The Port Wing Boreal Forest encompasses two areas of mature conifer forest on sand spits adjacent to Lake Superior separated by the Flag River and Port Wing Marina. Bordering the forests is a high-quality wetland complex comprising the Flag River estuary. The forests have boreal characteristics and are dominated by large white and red pines as well as white spruce, balsam fir, red maple, white birch, mountain maple, yellow birch, and white cedar.

The wetlands include Great Lakes Shore Fen with a floating sedge mat, Poor Fen with a grounded Sphagnum-sedge mat, Alder Thicket, and Northern Tamarack Swamp. The complex contains typical fen and bog species such as pitcher plant, sundews, bladderworts, and sedges. A small 20-acre beach and dune complex stretch for three-quarters of a mile along the Lake Superior shoreline on the west side of the Flag River mouth, with the dune dominated by marram grass, Canada wild rye, beach pea, and sand cherry.

Significance: This site encompasses both remnant boreal and northern dry-mesic forests as well as a high-quality wetland complex. The wetland complex includes one of only ten high-quality Great Lakes Shore Fen sites in the state, and supports three rare plants (all special concern), as well as a Northern Tamarack Swamp that contains the only known record in the state of a State Endangered plant. A State Threatened plant is also known from the tamarack swamp. The forests are mature with very large trees and a complex, multi-layered canopy that supports a wide variety of bird life, including a rare neotropical migrant that only breeds in dense, mature coniferous northern forests, usually of spruce and fir. Resident birds in the forest are very diverse and include veery, blue-headed vireo, northern parula, blackburnian warbler, American redstart, purple finch, and white-throated sparrow, as well as three Special Concern wetland birds.

Management Considerations: Recent wind events have blown down some of the largest trees in the eastern unit of the forest, which were salvaged to reduce the threat of fire. Thousands of conifer seedlings were handplanted in resulting gaps to enhance regeneration and long-term forest composition and age structure. Deer browse is a

concern on both planted seedlings as well as on the State Endangered plant in the tamarack swamp, of which all stems were severely browsed. Managing both nutrient inputs in the wetland complex is a crucial challenge. Substantial portions of the Great Lake Shore Fen near Bibon Lake have converted to non-native cat-tail, likely due to excess nutrient inputs. The source of nutrients is unknown, but could be related to the former sewage lagoons south of the site, lawn fertilizers, or agricultural practices upstream in the watershed. Management of both wetland and upland invasive species should be a priority. Forest invasives include hemp-nettle, particularly in the blow-down area. The beach and dune receive moderate levels of foot traffic by beach goers; use of motorized vehicles on the beach and dune is prohibited due to the thin vegetative cover over highly erodible soils and designation as a State Natural Area.

18) Primary Site – Bark Bay Slough State Natural Area**, 646 acres (**Map**)**

All State Natural Areas are primary sites. Please click the link to view the attributes of this State Natural Area.

19) Primary Site - Lost Creek Bog State Natural Area**, 852 acres (**Map**)**

All State Natural Areas are primary sites. Please click the link to view the attributes of this State Natural Area.

20) Primary Site – Nourse Sugarbush State Natural Area**, 438 acres (**Map**)**

All State Natural Areas are primary sites. Please click the link to view the attributes of this State Natural Area.